

Arginine Metabolism

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Objectives

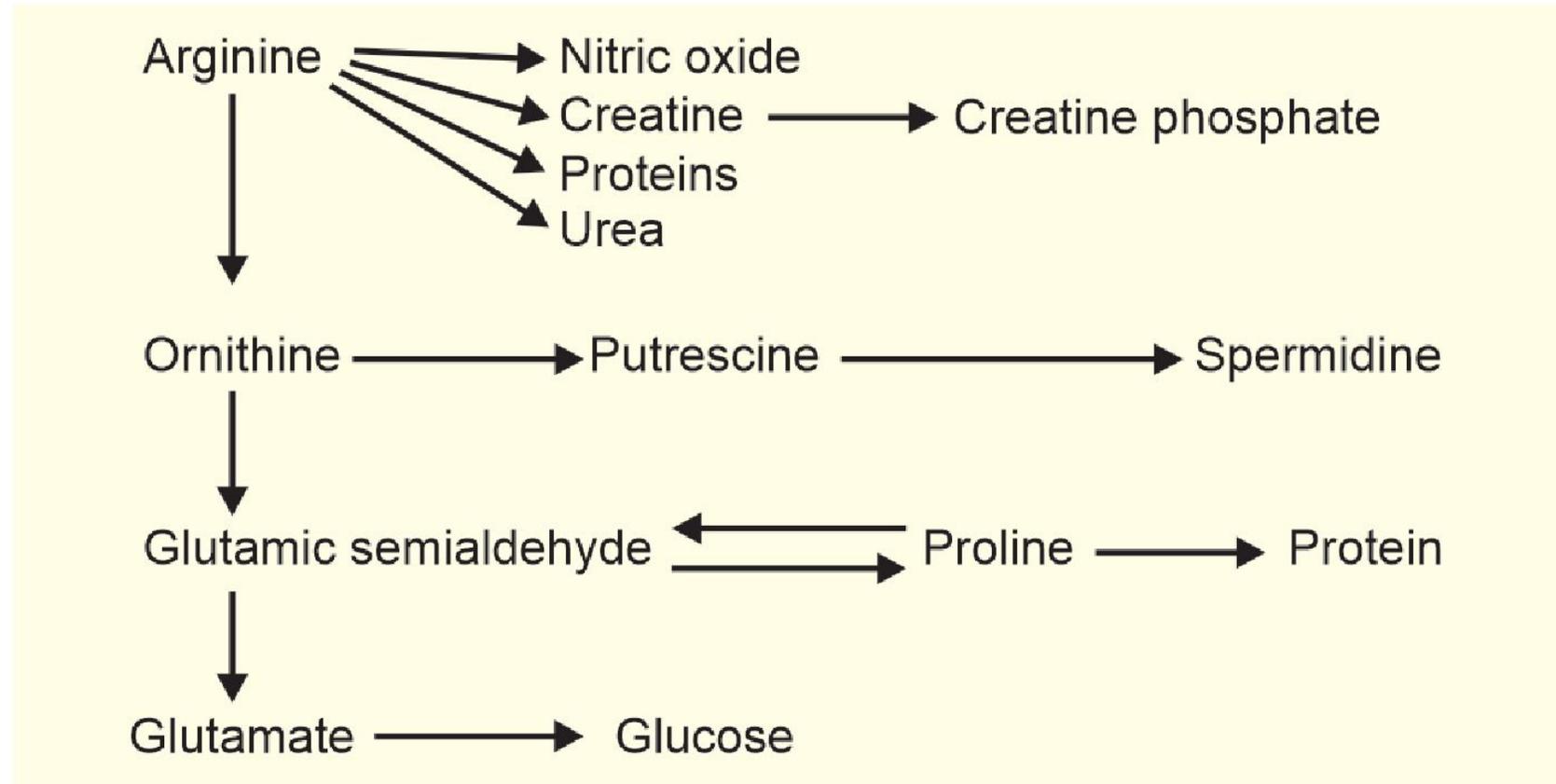
- Arginine Basics
- Nitric Oxide Synthase
- Isoenzymes of NOS
- Creatine Synthesis

Fates of Arginine

- ✓ Highly Basic AA
- ✓ Semi Essential AA
- ✓ Glucogenic Amino Acid.

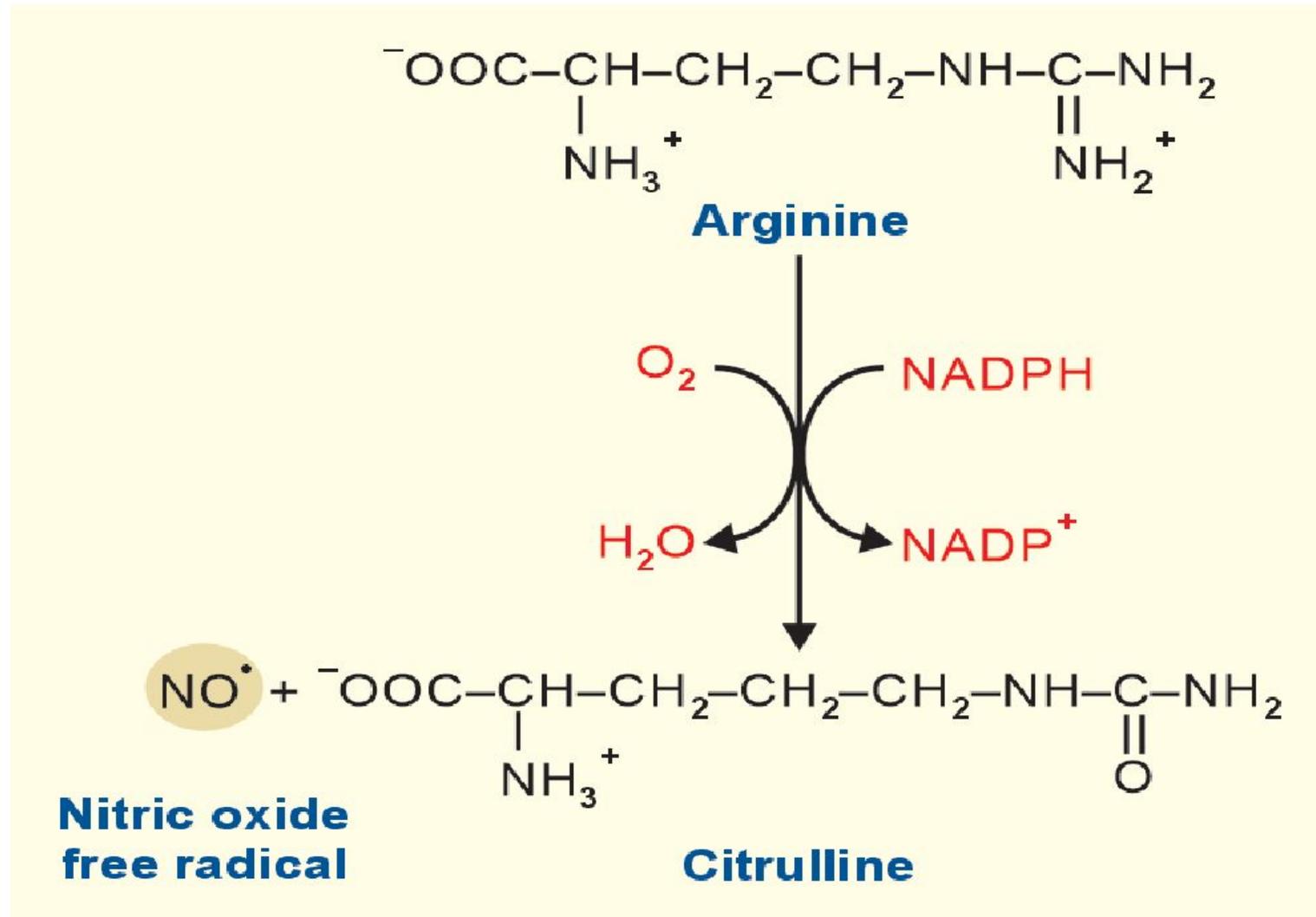
Arginine is involved in :

- 1) Nitric Oxide Synthesis.
- 2) Creatine Synthesis.
- 3) Protein Synthesis.
- 4) Urea Formation.



Nitric Oxide Synthesis

- ✓ Nitric oxide is formed from **arginine** by the enzyme **Nitric Oxide Synthase (NOS)**.
- ✓ NO• is a potent vasodilator.
- ✓ It contains Heme
- ✓ Co-Factor = FAD, FMN, NADPH and Tetrahydrobiopterin.
- ✓ Nitric oxide (NO•)
 - ✓ Toxic pollutant of Air
 - ✓ Automobile exhausts
 - ✓ Uncharged molecule
 - ✓ Unpaired electron,
 - ✓ So it is a highly reactive
 - ✓ “Free Radical”.



Isoenzyme of NOS

1) Neuronal NOS :

- ✓ NOS-1= nNOS
- ✓ Present in **Central & Peripheral neurons**
 - ✓ Cerebellum & GIT.
- ✓ Arterial Dilatation
 - ✓ Cerebral,
 - ✓ Coronary
 - ✓ Renal
 - ✓ Muscle arteries.
- ✓ Glutamates activates nNOS.
- ✓ NO• stimulates the hormones, CRH, GHRH & LHRH.

- ✓ Gene Alteration for NOS 1
 - ✓ Does long QT interval syndrome.

Isoenzyme of NOS

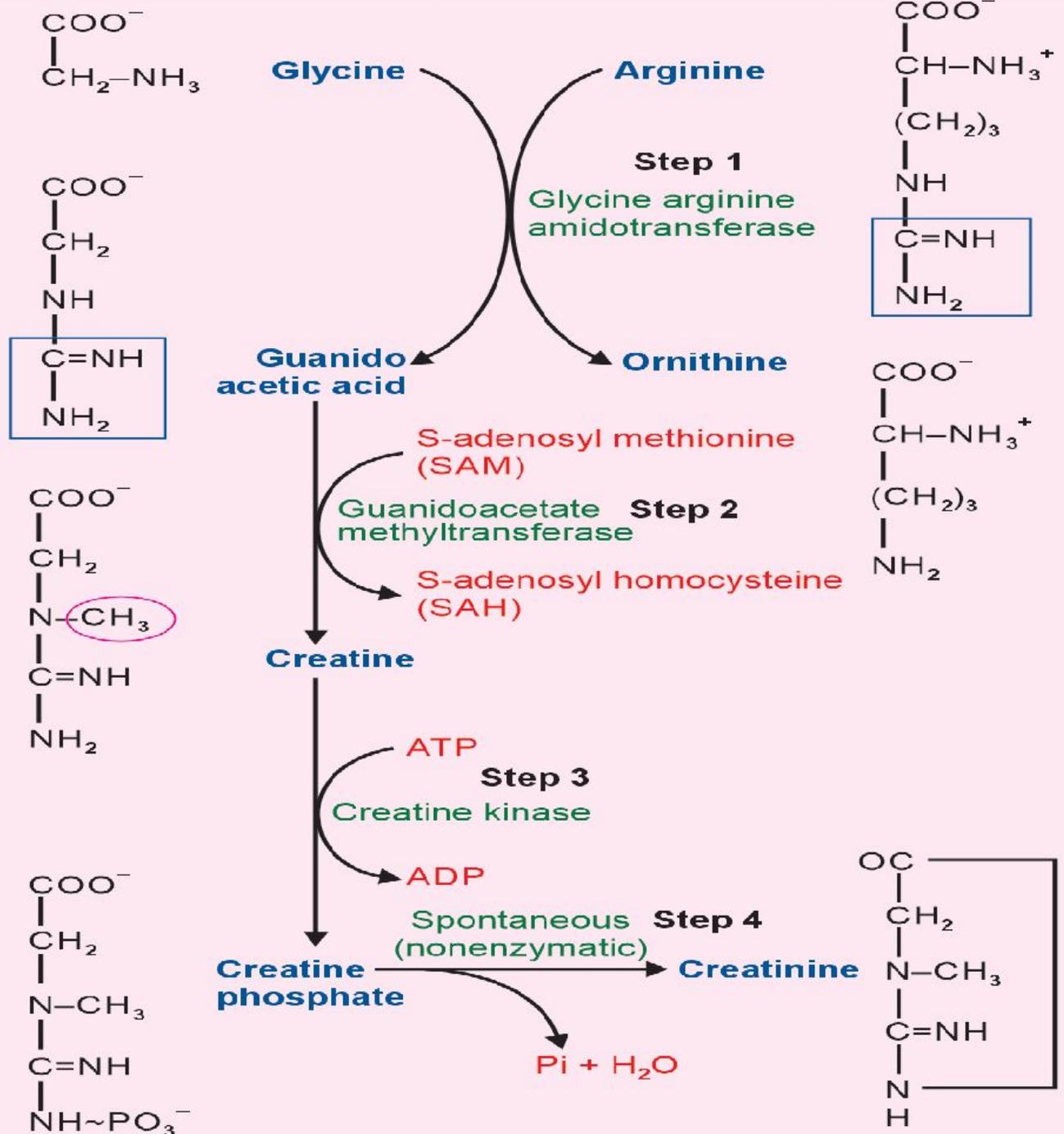
2) Macrophage NOS :

- ✓ NOS-2 = iNOS
- ✓ Present in **macrophages & neutrophils**
- ✓ Also present in **hepatocytes**.
- ✓ It is induced by cytokines and during inflammation by interleukin and tumor necrosis factor.

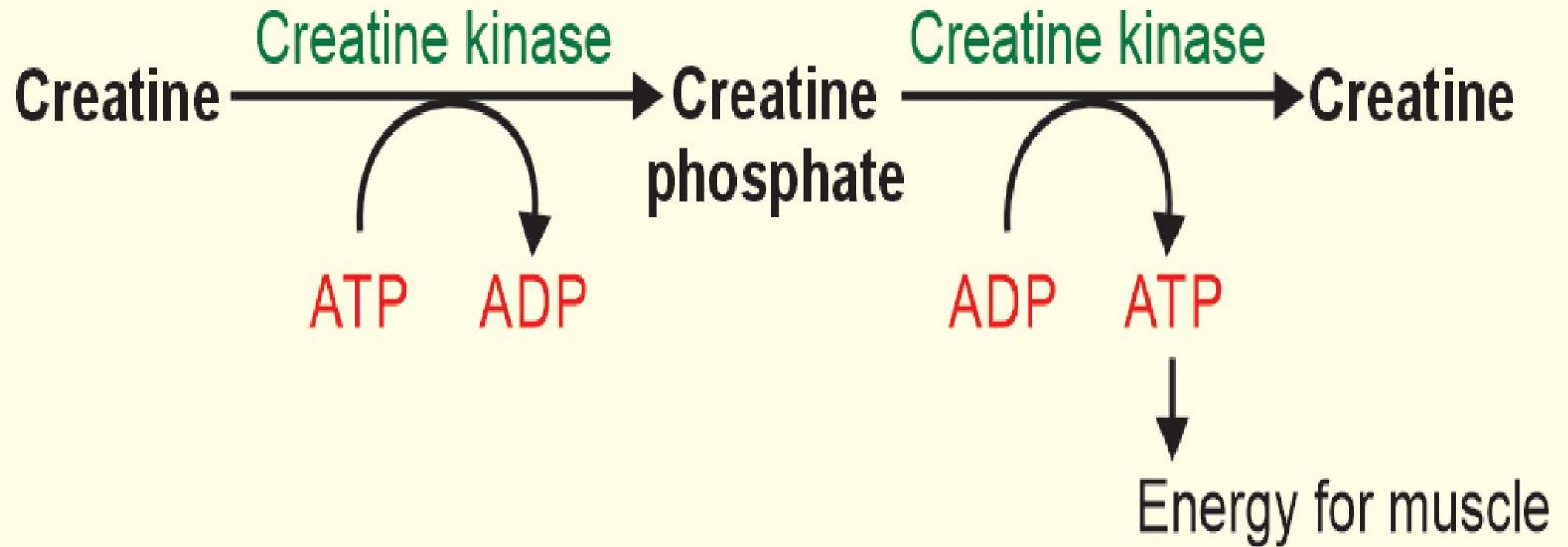
Isoenzyme of NOS

3) Endothelial NOS:

- ✓ NOS-3 = e NOS
- ✓ Present in **Endothelial cells, Platelets & Myocardium.**
- ✓ (NO•) constantly produced,
 - ✓ Arterial relaxation occurs.
 - ✓ Inhibits the adhesion of platelets
 - ✓ Depresses Platelet functions.
- ✓ NO• is a Noradrenergic and Non-Cholinergic neurotransmitter,
 - ✓ In the **GIT and Urogenital tract.**
 - ✓ Relaxes smooth muscles
 - ✓ Reduced gastrointestinal motility and relaxation of sphincters.



Lohman's Reaction



1) Arginine can be used , except

1. to reduce muscle tolerance during exercise
2. to reduce occurrence of angina pectoris
3. to reduce chance of embolism
4. All of Above

2) Synthesis of creatinine require

1. Glycine + Alanine + Arginine
2. Glycine + Arginine + Methionine
3. Methionine + Aspartate + Glutarate
4. Glutamate + Alanine + Methionine

3) Which combination of option is correct about Nitric oxide (**NO•**) ?

- It has unpaired electron.
- It contains Heme
- Its synthesis requires ATP as co-factor

- a) A & B
- b) B & C
- c) C & A
- d) All of Above

Thank You
For
Listening